(12) UK Patent Application (19) GB (11) 2 322 225 (13) A

(21) Application No 9724080.8

(22) Date of Filing 17.11.1997

(30) Priority Data
(31) 97004761 (32) 17.02.1997 (33) KR

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(51) INT CL^6
G11B 15/087 27/19

(52) UK CL (Edition P)
G5R RHD RHE

(56) Documents Cited
US 5097363 A

(58) Field of Search
UK CL (Edition P) G5R RHD RHE
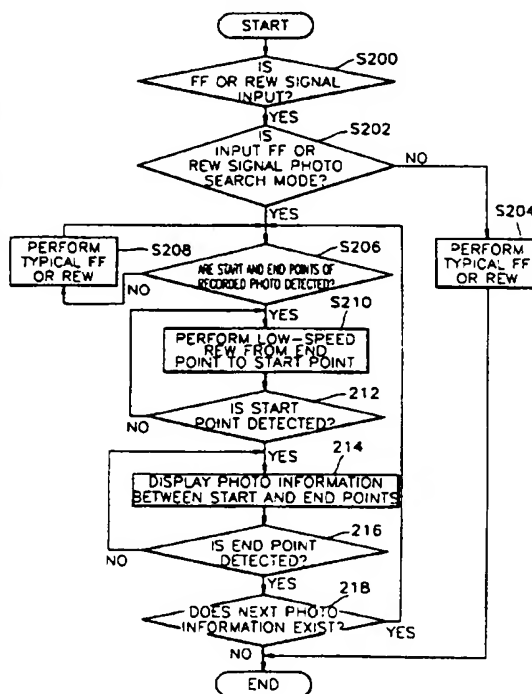INT CL^6 G11B 15/00 15/05 15/087 27/00 27/10 27/19
Online: WPI

(54) Abstract Title
Method of scanning and sequentially displaying picture information stored on a digital video cassette

(57) A method for detecting and reproducing a segment of information, for example a still image, recorded digitally on to a video cassette tape. The method comprises the steps of: (a) detecting the end point (206) of a segment of image data by reading the tape at a first, forward or reverse speed when a search command is input (202); (b) detecting the start point (212) of the same segment of data by scanning the data at a second, forward or reverse speed; (c) reading and displaying the image data stored between said start and end points of the image data segment. By repeatedly performing steps (a) through (c) (218) a plurality of discontinuously recorded images may be sequentially displayed. Therefore, several images may be continuously searched in a short time from a recording medium in which hundreds of frames of picture information are stored.
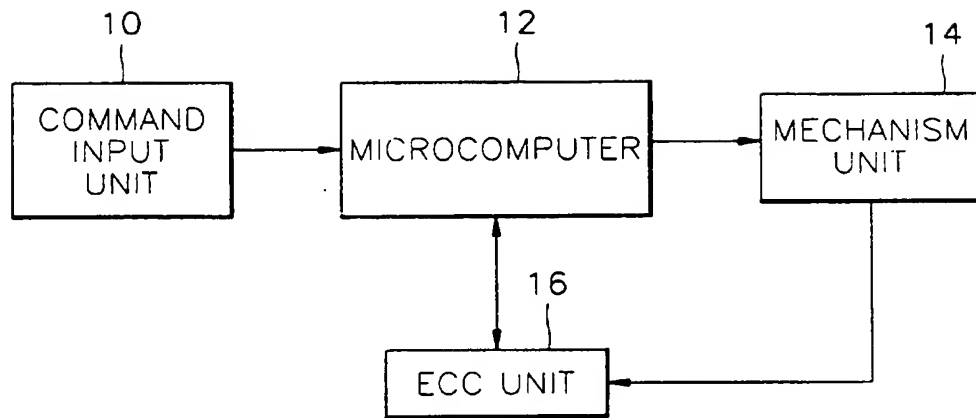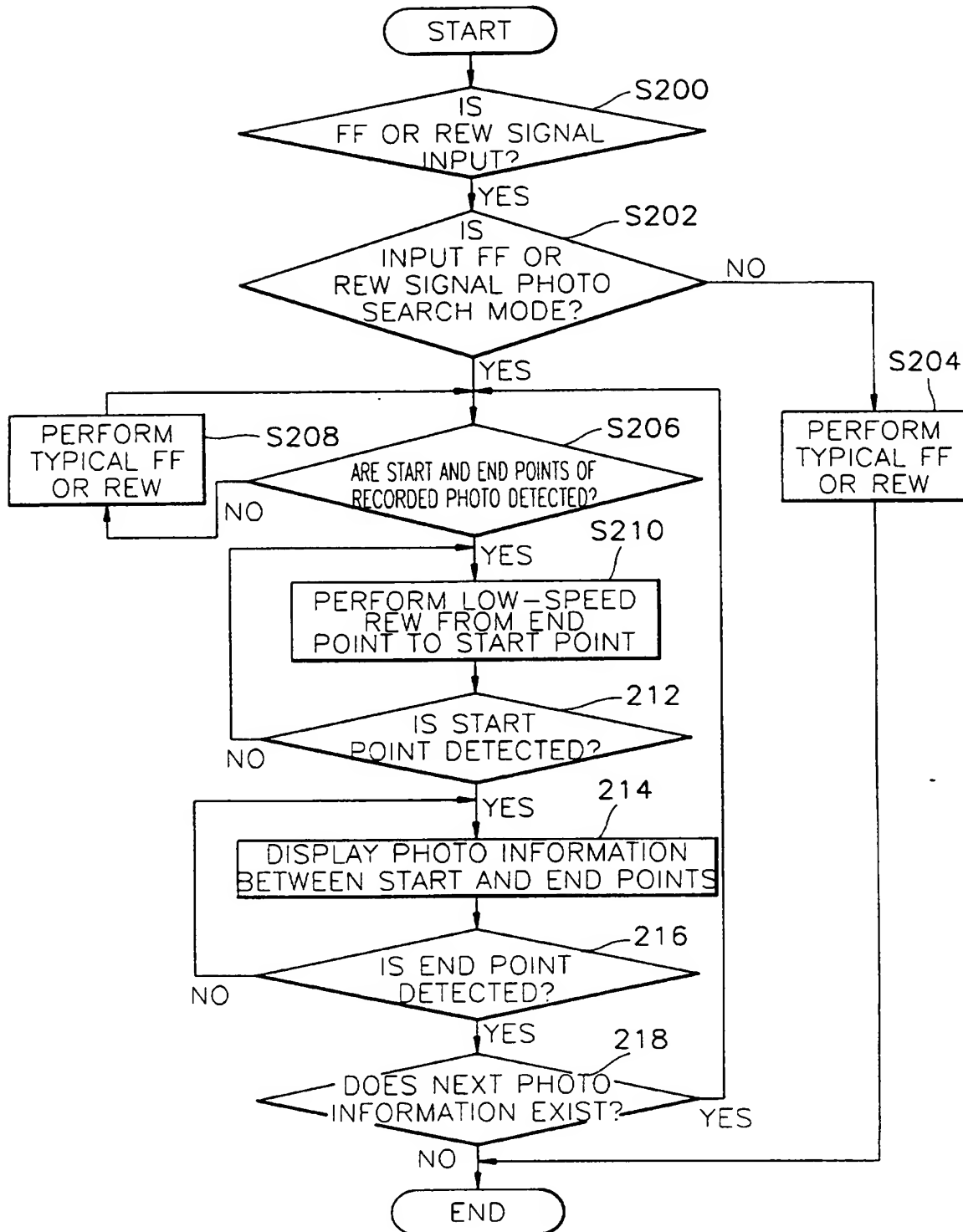
FIG. 2

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FIG. 1

FIG. 2

START

S200
IS
FF OR REW SIGNAL
INPUT?

YES

S202
IS
INPUT FF OR
REW SIGNAL PHOTO
SEARCH MODE?

NO

YES

PERFORM
TYPICAL FF
OR REW
S208

S206
ARE START AND END POINTS OF
RECORDED PHOTO DETECTED?

NO

S204
PERFORM
TYPICAL FF
OR REW

YES

S210
PERFORM LOW-SPEED
REW FROM END
POINT TO START POINT

212
IS START
POINT DETECTED?

NO

YES

214
DISPLAY PHOTO INFORMATION
BETWEEN START AND END POINTS

216
IS END POINT
DETECTED?

NO

YES

218
DOES NEXT PHOTO
INFORMATION EXIST?

YES

NO

END

FIG. 3A

DISCONTINUITY	PHOTO RECORDING PORTION	DISCONTINUITY	PHOTO RECORDING PORTION	DISCONTINUITY	PHOTO RECORDING PORTION
START		END START		END START	

FIG. 3B

①FF
②LOW-SPEED REW
③PLAY
④FF
⑤LOW-SPEED REW
⑥PLAY
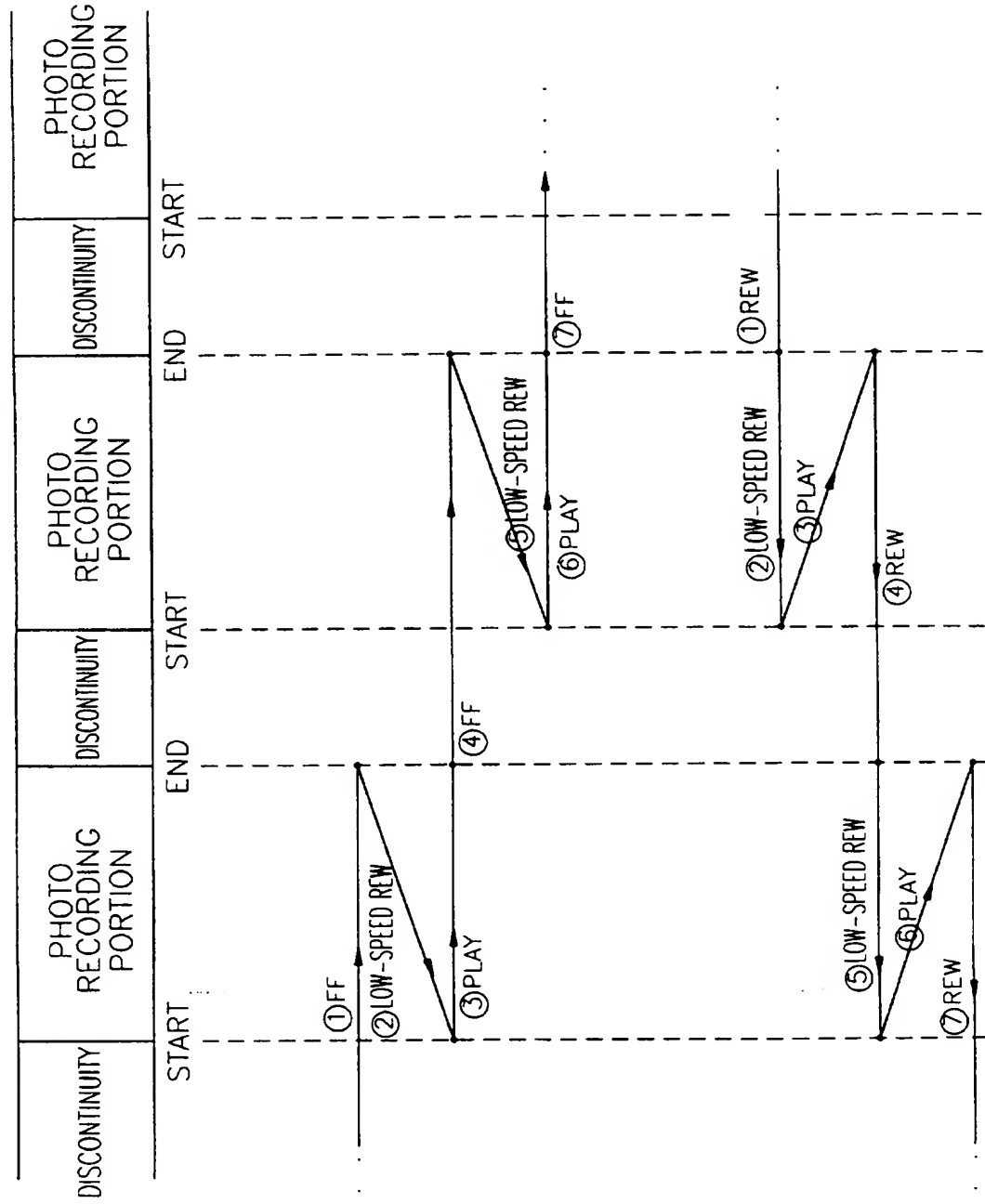⑦FF

FIG. 3C

①REW
②LOW-SPEED REW
③PLAY
④REW
⑤LOW-SPEED REW
⑥PLAY
⑦REW

METHOD FOR SEARCHING PHOTO INFORMATION
IN DIGITAL VIDEO CASSETTE RECORDER (DVCR)

5   The present invention relates to a method for searching photo information in a digital video cassette recorder (DVCR), and more particularly, to a photo information searching method for conveniently displaying a plurality of discontinuously-recorded photo information.

10   A digital camcorder, including a photographing unit in addition to the functions of a DVCR, can record a digital moving picture compression signal on a VHS tape and reproduce the recorded signal. That is, 12 gigabytes of digital signals equivalent to up to 150 minutes of
15   video can be recorded on a tape. Also, since the digital camcorder uses digital compression and restoration techniques, noise is kept to a minimum, the quality of image does not deteriorate even during recursive reproduction, compact disk quality sound can be realized,
20   and about 500 sheets of photo information can be stored on a 60-minute tape and edited.

    The photo information is sequentially recorded on a predetermined number of frames when the photographing unit
25   of the digital camcorder photographs a subject. In the prior art, a user must manually search desired photo information from a recording medium on which a predetermined number of photo information is discontinuously recorded, including manually selecting
30   between FF or REW and play modes.

    It is an aim of at least preferred embodiments of the present invention to provide a method for searching desired photo information conveniently and within a short

time by continuously displaying discontinuously-recorded photo information.

According to the present invention, there is provided a method for searching discontinuous photo information recorded on a recording medium, said method for use in a digital video cassette recorder performing reproduction at a variable speed, said method comprising the steps of: (a) detecting the end point of a piece of the discontinuously-recorded photo information by performing reproduction at a first variable speed when a search command is input; (b) detecting the start point of the photo information corresponding to the end point by performing reproduction at a second variable speed; and (c) reproducing and displaying photo information between the detected start and end points of the photo information, wherein a plurality of pieces of the discontinuously-recorded photo information are continuously searched by repeatedly performing the steps (a) through (c).

Preferably, the start and end points of the photo information are detected using photo recording information recorded in a subcode area of a recording medium.

Preferably, the reproduction at the first variable speed is a FF or REW reproduction, and the reproduction at the second variable speed is slower than the REW reproduction at the first variable speed.

For a better understanding of the invention, and to show how embodiments of the same may be carried into effect, reference will now be made, by way of example, to the accompanying diagrammatic drawings, in which:

Figure 1 is a block diagram showing the configuration of a preferred digital image reproducing apparatus for continuously searching discontinuous photo information;

5   Figure 2 is a flowchart outlining a continuous search method for discontinuous photo information recorded in a digital recording medium; and

Figures 3A, 3B and 3C are diagrams showing a path for
10   continuously searching discontinuous photo information, wherein Figure 3A shows a digital recording medium where discontinuous photo information is recorded, and Figures 3B and 3C show paths for continuously searching the digital photo information of Figure 3A in FF and REW
15   modes.

Referring to Figure 1, a digital image reproducing apparatus is shown including a command input unit 10 for applying an execution command, a microcomputer 12 for
20   receiving a predetermined subcode and outputting a control signal corresponding to the received subcode according to the execution command output from command input unit 10, a mechanism unit 14 for controlling the speeds of a capstan motor, a drum motor, etc., using the control
25   signal output by the microcomputer 12, and performing reproduction at first and second variable speeds, and an ECC(Error Correction Code) unit 16 for detecting and correcting the error of a reproduced digital signal, and outputting the subcode of reproduction data from an
30   internally-installed memory. Preferably, the first variable speed denotes the typical FF or REW reproduction, and the second variable speed denotes a REW reproduction which is slower than the first variable speed.

The operation of the apparatus shown in Figure 1 will now be described as follows.

First, when a search execution command (hereinafter, called a photo search command) of a low-speed REW mode (second variable mode) as distinct from a typical FF/REW mode (first variable speed) is input through the command input unit 10 in order to search discontinuous photo information, the microcomputer 12 receives the photo search command and switches to a photo search mode. In the photo search mode, the microcomputer 12 controls the mechanism unit 14 to perform an FF/REW operation at the first variable speed until the end point of a first photo information recorded on a tape is detected. When the end point of the first photo information is detected, the mechanism unit 14 is controlled so that a normal reproduction for displaying searched photo information is performed after a low-speed (second variable speed) REW reproduction is performed up to the start point of the first photo information. Here, the microcomputer 12 determines the start and end points of the photo information by reading the contents of the subcode digitally recorded in a memory of the ECC unit 16 in case of a digital control method.

Also, the low-speed (second variable speed) REW reproduction, which is slower than the first variable speed, is performed when the end point of the photo information is detected, to search the exact start point when the photo information is searched from the end point to the start point.

Also, for a continuous photo search, a typical FF/REW reproduction of the first variable speed is performed until the end point of a second photo information is

detected after a first piece of photo information is displayed. That is, when the photo search is performed in a FF mode, the FF operation is performed after the completion of display of each photo information. When the photo search is performed in a REW mode, the REW operation is performed after the display of each photo information.

Also, the low-speed FF/REW operation controls a drum motor and a capstan motor of the mechanism unit 14 according to a phase control that is different from the typical FF/REW operation. The phase control is performed in a method such as an analog FM correction. However, in a digital correction, correction is for correctly reading a subcode rather than the correction itself.

Figure 2 is a flowchart outlining a preferred method for continuously searching discontinuous photo information recorded in a digital recording medium.

Figures 3A, 3B and 3C are diagrams showing a path for continuously searching discontinuous photo information, wherein Figure 3A shows a digital recording medium where discontinuous photo information is recorded, and Figures 3B and 3C show paths for continuously searching the digital photo information of Figure 3A in FF and REW modes.

Now, the photo search method shown in Figure 2 will be described with reference to Figures 3A, 3B and 3C.

In step 200, a determination of whether a predetermined FF/REW execution command signal is input is made. Then, a determination of whether or not the input FF/REW execution command signal is a photo search mode is made in step 202.

If the input FF/REW execution command signal is not the photo search mode, the typical FF or REW operation of the first variable speed is performed in step 204. Otherwise, a determination of whether the end point of a piece of photo information was detected by the typical FF or REW operation is made in step 206. If the end point of a recorded photo information is not detected, the typical FF or REW operation continues until the end point of the recorded photo information is detected in step 208.

When it is determined in step 206 that the end point of the recorded photo information is detected, the low-speed (second variable speed) REW operation is performed up to the start point of the piece of photo information corresponding to the end point, in step 210.

That is, in order to detect the end point of the recorded piece of photo information in the FF mode shown in Figure 3B, the low-speed REW operation is performed from the end point to the start point when the end point is detected by the typical FF mode operation.

Also, in order to detect the end point of the recorded photo information in the REW mode shown in Figure 3C, the low-speed REW operation is performed from the end point to the start point when the end point is detected by the typical REW mode operation.

When the start point is detected in step 212, the photo information is displayed in step 214. When the end point is detected in step 216, a determination of whether or not the next photo information exists is made in step 218. If the next photo information exists, another photo search operation is performed in the same way starting from the step 206.

As described above, in the preferred method for searching photo information in a digital image reproduction apparatus, several frames of photo information are continuously searched and displayed in a short time from a recording medium in which hundreds of frames of photo information are discontinuously recorded.

The reader's attention is directed to all papers and documents which are filed concurrently with or previous to this specification in connection with this application and which are open to public inspection with this specification, and the contents of all such papers and documents are incorporated herein by reference.

All of the features disclosed in this specification (including any accompanying claims, abstract and drawings), and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive.

Each feature disclosed in this specification (including any accompanying claims, abstract and drawings), may be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features.

The invention is not restricted to the details of the foregoing embodiment(s). The invention extends to any novel one, or any novel combination, of the features disclosed in this specification (including any accompanying claims, abstract and drawings), or to any

novel one, or any novel combination, of the steps of any method or process so disclosed.

CLAIMS

1.   A method for searching discontinuous photo information recorded on a recording medium, said method for use in a digital video cassette recorder performing
5   reproduction at a variable speed, said method comprising the steps of:

(a) detecting the end point of a piece of the discontinuously-recorded photo information by performing
10   reproduction at a first variable speed when a search command is input;

(b) detecting the start point of said photo information corresponding to said end point by performing
15   reproduction at a second variable speed; and

(c) reproducing and displaying photo information between said detected start and end points of said photo information,
20

wherein a plurality of pieces of the discontinuously-recorded photo information are continuously searched by repeatedly performing said steps (a) through (c).

25   2.   The method as claimed in claim 1, wherein the start and end points of said photo information are detected using photo recording information recorded in a subcode area of a recording medium.

30   3.   The method as claimed in claim 1 or claim 2, wherein said reproduction at the first variable speed is a FF or REW reproduction.

4.   The method as claimed in claim 1, 2 or 3 wherein said reproduction at the second variable speed is slower than said REW reproduction at the first variable speed.

5   5.   A method for searching discontinuous photo information substantially as hereinbefore described with reference to the accompanying drawings.

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The Patent Office

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Application No: GB 9724080.8	**Examiner:** Robert MacDonald
Claims searched: 1-5	**Date of search:** 30 January 1998

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

    UK Cl (Ed.P): G5R(RHD, RHE)

    Int Cl (Ed.6): G11B(15/00, 15/05, 15/087, 27/00, 27/10, 27/19)

Other: Online:WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	US 5097363 (TAKEI et al.) See figure 7 and column 6 lines 26 to 43.	1-4